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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,414	01/22/2002	Chang-Won Choi	8045-33	5089

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EXAMINER

KACKAR, RAM N

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/054,414

Applicant(s)

CHOI ET AL.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-12 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-3 and 5-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In these claims recitation is made of resistance (electrical) of the edge ring. It may be pointed that resistance of the edge ring would be geometry dependent and may depend upon where it is measured. It will also depend upon the resistivity of the material it is made of. Moreover, the indefiniteness is also due to it being compared to the resistance of the wafer which itself may be variable.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 and 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPR) in view of Roderick et al (US 6074488) and Ke et al (US 6284093).

AAPR (Fig 2) discloses an edge ring with a slanted step portion (Fig 2), which appears to have the same angle as the invention (Fig 4). The difference between the invention and AAPR being the resistivity of the material of the edge ring.

Roderick et al discloses an edge ring (Fig 2-230) and teach that it is made of a low resistance semiconductor dielectric like silicon and could also be doped to further adjust resistivity or conductivity (Col 8 lines 49-60).

Ke et al have studied the effect of slant angle and the spacing and teach that the slant angle (Col 11 lines 3-8) and spacing (Col 11 lines 33-35) produce a focusing effect which modifies the ion flux distribution and therefore must be determined empirically.

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to optimize the resistivity, slant angle and spacing of the edge ring to obtain consistent and uniform plasma sheath for uniform processing. This type of optimization has been held obvious.

#### ***Response to Arguments***

Applicant's arguments filed 10/15/2003 have been fully considered but they are not persuasive.

Applicant argues that the use of term "resistance" in the context of claim numbers 1-3 and 7-9 is definite. While the meaning of resistance is well understood and resistance may in some instances be used interchangeably with resistivity, but its use in the given context must provide a clear and unambiguous idea to one of ordinary skill in the art. In this instance the use of this word in the claims does not convey a clear and unambiguous meaning and scope to one of ordinary skill in the art.

Applicant further argues that in Roderick and Ke the term resistance has been used repeatedly. Roderick (Col 8 line 50) uses term "resistance" and defines this in term of electrical conductivity (inverse of resistivity) on line 54 and its quantitative assessment on line 67 in terms

of  $10^{-3} \Omega\text{cm}$  (a measure of resistivity). Compare this with claim 2, 3, 8 and 9 where  $\Omega$  (a measure of resistance) is disclosed.

In Ke et al “The coupled RF power also is inversely proportional to the electrical resistance of the silicon ring” (Col 13 line 44-45) is not ambiguous because for a particular silicon ring resistance and resistivity are directly related.

Since the measure of resistance on a three dimensional object like an edge ring depends upon the points between which it is measured it is essential that the written disclosure define the way this is done. Resistivity on the other hand is related only to the material property and independent of the geometry, and therefore provides an unambiguous and absolute meaning and does not have to be explained further.

In claims 1 and 7 applicants claim the resistance to be less than the resistance of an unspecified wafer. Wafer is not a part of the chuck assembly but placed on it for processing and may have variable properties. This relative terminology clearly makes these claims indefinite (See MPEP 2173.05(b)).

The applicant has tried to put forth the same argument in regards to art rejection and argued that the prior art does not disclose resistance less than that of an unspecified wafer because the dimensions of the wafer with respect to edge ring could change.

As explained above, this argument is not persuasive.

*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone number for the organization where this application or proceeding is assigned is 703 872 9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK

*Primary Examiner  
AV 1763  
P. Hassanzadeh*